CLAIMS

What is claimed is:

1. A system for determining the location of a target, comprising:

a plurality of light sources;

a projection surface with at least two sides, oriented in such a way that the light sources can illuminate one side of the projection surface;

a target located entirely between the light sources and one side of the projection surface, and away from the projection surface; and

an imaging device located on the side of the projection surface opposite the target, the imaging device being configured to detect a shadow from the target on the projection surface caused by individual ones of the light sources .

2. The system of claim 1, wherein the one or more light sources are infrared light sources, and the imaging device is sensitive to infrared light but not sensitive to visible light.

3. The system of claim 2, wherein the imaging device is a video camera.

4. The system of claim 3, wherein the video camera comprises a lens, and the system further comprises a filter for blocking visible light, located on the lens of the video camera.

5. The system of claim 4, wherein a polarizing filter is placed on the light sources.

6. A method for determining the location of a target, comprising the steps of:

using a plurality of light sources to illuminate the target in front of a translucent screen, so that each light source, when illuminated, causes the target to cast one shadow on the translucent screen;

using a video camera that is sensitive to infrared light but impervious to visible light to record a shadow of the target caused by each of the light sources appearing on the side of the translucent screen opposite the target as a series of images, each image comprising a plurality of pixels;

assigning all pixels in the images that represent a shadow a certain value, and assigning all pixels in the images that represent anything other than a shadow a different value; and

determining the target's location from the size and location of the shadows.

7. The method of claim 6, wherein only one of the one or more light sources provides light at any given time.

8. The method of claim 7, wherein:

the light sources are alternately illuminated at a particular switching rate, such that only one of the plurality of light sources is illuminated at any given time; and

the images are recorded at a particular frame rate.

9. The method of claim 8, wherein the switching rate is synchronized with the frame rate.

10. The method of claim 8, wherein the light sources are infrared light sources.

11. The method of claim 10, wherein the imaging device is a video camera that is sensitive to infrared light but impervious to visible light.

12. The method of claim 6, wherein the intensity of light emitted by one of the plurality of light sources is different than the intensity of light emitted by another one of the plurality of light sources.

13. The method of claim 6, wherein the light emitted by one of the plurality of light sources is polarized differently than the light emitted by another one of the plurality of light sources.

14. The method of claim 6, wherein the step of determining the target's location involves determining the distance between the target and the translucent screen.

15. The method of claim 6, wherein the target is a portion of a person's body, and wherein the step of determining the person's location involves determining the location of a top of the person's head.

16. The method of claim 6, wherein the target is a portion of a person's body, and wherein step of determining the person's location involves determining the location of one or more of the person's extremities

17. The method of claim 16, wherein the step of determining the person's location involves determining the distance between one or more of the person's extremities and the translucent screen.

18. The method of claim 6, further comprising the steps of:

using the person's location to alter what appears on the translucent screen.